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Dutton & Co., New York.—The Department of Commerce, Bureau of the Census, announces *United States Life Tables, 1890, 1901, 1910 and 1901–1910* [496 pp., 52 full page graphs, 22 diagrams, and 185 tables. Price $1.25].

The twenty-seventh volume of the *Bulletin of the American Mathematical Society* contains a portrait of Professor F. N. COLE and the following dedication:

By order of the Council of the Society, this volume
is dedicated to

FRANK NELSON COLE

in appreciation of his devotion to the Society during his
twenty-six years as Secretary and in recognition of
his efficient leadership in the editorial
work of the Bulletin for
the past twenty-four
years.

These are published with the concluding number (June–July, 1921).

ARTICLES IN CURRENT PERIODICALS.

ANNALES SCIENTIFIQUES DE L'ÉCOLE NORMALE SUPÉRIEURE (3d series), volume 38, January, 1921: "Aplatissement suivant l'axe polaire . . . d'une goutte liquide de révolution" . . . by J. Boussinesq, 1–12 [First paragraph: "Parmi les analogies physiques auxquelles pensèrent les théologiens du XIII^e siècle pour s'expliquer la sphéricité de la Terre, il y a celle de gouttes de pluie ou de rosée que l'on voit pendre aux feuilles des arbres, gouttes si bien arrondies surtout après s'être détachées pour tomber en chute libre. Ces théologiens sembleraient donc avoir admis, au moins implicitement, la fluidité primitive de notre globe, comme le firent d'une manière explicite, cinq cent ans plus tard, Newton et ses disciples en recourant à la pesanteur. Or il peut y avoir un certain intérêt théorique à poursuivre la même analogie des gouttes d'eau, mais d'une manière plus précise que ne l'a fait Plateau" . . .]—February to June: "Sur certaines fonctions automorphes de deux variables" by Georges Giraud, 43–164 [Quotation from page 55: "Voici donc le tableau d'ensemble de notre classification des substitutions linéaires: Substitutions hyperboliques; Substitutions elliptiques, à trois points doubles, à plan double—pénétrant a l'hypersphère principale, —extérieure a cette hypersphère; Substitutions paraboliques, à deux points doubles, à plan double, à point double unique; Substitution identique."]

THE ELECTRICIAN, volume 87, August 19, 1921: "The thermionic tube, a return to simplicity" by L. C. Pocock, 232–234 ["It is of course important to remember that the practical formulæ are only approximately true under finite conditions, and it is important to understand the differential equations associated with the action of the tube, but since the final formulæ in many cases depend upon the simplifying assumptions rather than on the differential equations, it may be of use to show how a simple explanation can be given"]—September 23: "Notes of the week: Progress in harmonic analysis," 373 ["Seeing however that in actual electromotive force waves, there are an infinite number of harmonics present and only a limited number of ordinates are drawn, though Mr. Clayton's method may work out well in practice, it is hardly likely to be held in very high favor among mathematicians who cling closely to Cambridge traditions"]; "The Heaviside unit and unit impulse functions" by A. Press, 376–377 ["Consider the functions, $y = x^m$, $U = x^{dm}$. We may define the Heaviside unity function, U, as the limiting form of the prior function as m approaches zero value from positive values of m only. However, the matter is not as simple as might appear due to the prevailing laxity in the use of the word 'limit' in mathematical literature. (Compare in this regard, *Fundamental Conceptions of Modern Mathematics* by Richardson and Landis, Open Court Publishing Company)" . . . "$x^0 = x^{dm} = U$. The index, zero, implies here that m approaches this value from plus values whence the index may be written dm if preferred."—A mathematical (?) exposition.]

L'ENSEIGNEMENT MATHÉMATIQUE, volume 21, 1920, nos. 5–6 (published July, 1921): "La notion d'équivalence dans la théorie des groupes" by G. A. Miller, 251–254; "Quelques remarques sur un théorème relatif à la série hypergéométrique et sur la série de Kummer" by C. Cailler, 255–259; "Méthode à suivre pour déterminer la totalité des nombres premiers comprise entre 1 et le nombre $N = 1.2.3.5.7.11. \cdots p$, produit des $(\alpha+1)$ nombres premiers consécutifs pris a partir de 1" by E. Barbette, 260–265; "Sur l'équation fonctionelle $f[\varphi_1(t)] = f[\varphi_2(t)]$" by R. Wavre, 265–277; "Sur l'enseignement de calcul différentiel et intégral en Grèce" by P. Zervos, 278–281; "La préparation théorique et pratique des professeurs de mathématiques de l'enseignement secondaire en Argentine" by N. B. Moreno, 281–304; "La Commission Internationale de l'Enseignement Mathématique de 1908 à 1920.—Compte rendu sommaire suivi de la liste complète des travaux publiés par la Commission et les Sous-commissions nationales" by H. Fehr, 305–342; "Chronique," 343–349; "Bibliographie," 349–353; "Bulletin bibliographique," 354–366; Index, 367–370.

Giornale di Matematiche di Battaglini, volume 58, July–December, 1920: "Dimostrazione vettoriale di alcuni teoremi di Kasner," Nota di Clara Abbondati, 193–208 [Foot-note: "Edw. Kasner, 'The trajectories of Dynamics,' *Trans. American Mathem. Society*, v. 7, pp. 401–424, 1906; 'Dynamical trajectories: the motion of a particle in an arbitrary Field of Force,' *Ibid.*, v. 8, pp. 135–158, 1907."]

The International Studio, volume 74, November, 1921: "Dynamic symmetry and its practical value today" by Maxwell Armfield, 76–85 [See *1920*, 314].

Journal of the Indian Mathematical Society, volume 13, June, 1921: "Third conference of the Indian Mathematical Society," 81–89; "An extension of Feuerbach's theorem" by M. B. Rao, 109–116; Questions and Solutions, 117–120.

Mathematical Gazette, volume 10, October, 1921: "Mathematicians and their work" by L. J. Mordell, 321–323 [Review of F. Cajori, *A History of Mathematics*, 2d edition. "Prof. Cajori has taken the opportunity of adding a few new chapters, and of completely revising, in the light of modern knowledge, that part of his *History* dealing with the older work. The greatest attraction, however, of the volume is the account of the nineteenth and twentieth centuries, which now forms some two hundred of the present five hundred pages, making it almost a new history. There are two obvious difficulties in writing this section; not only are many of those mentioned still living, but of far more importance is the difficulty of keeping in touch with, and being conversant with, the relative importance of developments along so many different and unconnected lines. Prof. Cajori has solved the second difficulty by quoting extracts from reports and addresses by numerous experts. These, moreover, he has blended so well with his other material that he has produced a most useful and fascinating volume"]; "Mathematical Notes: A proof of the formula for the volume of a tetrahedron, in terms of the rectangular coördinates of its vertices" [not involving the square root which appears in most proofs but disappears in the result] by R. F. Muirhead, 324–325.

The National Marine, New York, volume 18, July, 1921: "The evolution of the patent log. How early mariners measured distances through the water and the improvements that have been wrought" by Bradley Jones, 1–14.

Nature, volume 108, October 6, 1921: "L'espace dans la chemie" (editorial), 171–172 [Review of D. A. Clibbens, *The Principles of the Phase Theory*. "The present work of Dr. Clibbens is the first book in English to attack seriously the real geometry of the subject. He carries us from the delightful simplicity of the binary systems right to the real thing—quaternary and quinary systems"]; Review of J. Cusack, *The Arithmetic of the Decimal System* by S. Brodetsky, 174–175 [The author does not adopt the metric system, but uses the decimal system with the present English units, the yard, the hundredweight, the gallon, the pound sterling, etc.]—October 13: "An algebraical identity" by R. F. Whitehead, 212 [Reply to an inquiry as to the primitive character of a solution of Gauss's cyclotomic equation]; "Notes," 222–226 ["In his address on October 3 to the newly constituted Glasgow Society for Psychical Research Sir Oliver Lodge gave an interesting exposition of his view of the æther of space as a region of possibilities in contrast with matter as a region of facts . . . he argued that if mind when dissociated from matter continues to exist, it can only be that there is something else which can perform the function of matter and serve as its instrument. For himself he has told us he is convinced that disembodied spirit personalities do exist in fact, and therefore for him it would seem the æther is a necessary postulate. His acceptance of the principle of relativity does not apparently in the least affect his belief in the real physical existence of the æther; it seems only to have added a few more negative qualities to that exceedingly elusive stuff and made its residual positive reality more than ever difficult to imagine. Still, perhaps the new society may succeed where Michelson and Morley failed, for psychical research, as Sir Oliver conceives it, is purely and essentially physical research, however suspect to some of us its methods may appear."]—October 20: "The tendency of elongated bodies to set in the north and south direction" by A. Schuster, 240 [. . . "it may be pointed out that the earth's centrifugal force would act in a manner tending in the direction of the alleged effect, though the resulting couple is so minute that it would be extremely difficult to verify it experimentally. If a horizontal rod be placed in the north and south direction, its southern end is—in the northern hemisphere—further away from the earth's axis. The centrifugal force is therefore greater at the southern end, and if the rod be slightly displaced, the horizontal component of that force will tend to bring the rod back into the meridian plane."]; "Metaphysics and materialism" by H. W. Carr, 247–248 ["Materialism does not stand for any particular theory of the nature of matter, but for the general world-view that matter . . . exists and constitutes the reality of the universe, including reason and will, which as qualities or properties of some of its forms give rise to knowledge of it. This materialism reached the zenith of its expression in the Darwinian theory of natural selection, not in that theory itself . . . but in the implications which were generally accepted as contained in it, and especially in the application which was made of it to rationalize a world-view. It seemed to point a way by which it was possible to conceive, and to some extent to follow in its history, an evolution which had produced mind from an original matter. It may not be obvious at once that the mere rejection of the Newtonian concept of absolute space and time and the substitution of Einstein's space-time is the death-knell of materialism, but reflection will show that it must be so."]; "Notes" [Quotation from page 255: "*The Dictionary of Applied Physics* which Messrs. Macmillan and Co. Ltd. propose to issue under the editorship of Sir Richard Glazebrook is now in an advanced stage of preparation. The work will appear in five volumes of 600–700 pages each. . . . Dr. Horace Lamb has provided several articles on related mathematical questions."]; "Our astronomical column," 256 ["The Astronomical Union will meet next year in Rome, and among the Committee meetings that will be held there is one on calendar reform. . . . The main outlines of the reforms to be discussed include a more uniform arrangement of the lengths of the months, alteration in the position of the leap-day (the end of the year would be far more convenient from the point of view of astronomical tables), and making the incidence of the week-days the same every year by placing one day a year (two in leap-year) outside the weekly reckoning. . . . It is much easier to recognize the inconvenience of the present system than to agree on an alternative one."]

La Nature, volume 49_2, August 27, 1921: "Le problème de la suspension des voitures automobiles" by E. Weiss, 129–132—September 3: "Calculateur circulaire à disque mobile Arnault-Paineau" by J. Boyer, 70 supplément.

Periodico di Matematiche (See *1921*, 317) series 4, volume 1, no. 4, July, 1921: "Noterelle di logica matematica" by F. Enriques, 233–244; "I moti planetari e le leggi di Keplero" by E. Daniele, 245–262; "Gli inviluppi di linee curve ed i primordi del metodo inverso delle tangenti" by E. Bortolotti, 263–276; "Una interpretazione geometrica ed una estensione della divisibilità dei polinomî" by S. Pincherle, 276–282 [Suggests the representation of a polynomial of degree n by the point in space of $n + 1$ dimensions whose coördinates are the coefficients of the polynomial].

Philosophical Magazine, volume 42, September, 1921: "On certain fundamental principles of scientific inquiry" by Dorothy Wrinch and H. Jeffreys, 369–390; "The mental multiplication and division of large numbers" by V. A. Bailey, 390–397—October: "The convection coefficient in a dispersive medium" by A. Anderson, 509–511; "The forms of planetary orbits on the theory of relativity" by W. B. Morton, 511–522.

["Summary" (of article on certain fundamental principles of scientific inquiry): "It is shown that intensive theories of the structure of Nature which involve the use of infinite classes of entities of kinds known only by observation are not capable of yielding satisfactory accounts of the method by which we have acquired our knowledge of physics, and that the same applies to the theory of universal consent as a basis of scientific knowledge. The whole of a single person's knowledge is based upon a finite number of observations and his individual judgments, and the problem of a theory of scientific knowledge is to show how this can be carried out.

"It is clear that such a theory must depend on the theory of probability, and the question of the probability of physical laws and of inferences based on them is discussed. It is shown that it will never be possible to attach appreciable probability to an inference if it is assumed that all laws of an infinite class, such as all relations involving only analytic functions, are equally probable *a priori*. If inference is possible, the admissible laws must not be all equally probable *a priori*. It is suggested that all admissible laws can be arranged in a well-ordered sequence, each having a finite prior probability, and such that each is more probable than any that follows it in the sequence. The probabilities of the laws must form a convergent series. On this basis it is shown that with sufficient empirical verification of a law the probability of further inferences from it will approach certainty.

"There is reason to believe that all admissible laws must form an enumerable aggregate, and this condition, and apparently all others which are necessary, are satisfied if we suppose that all laws admissible in physics are expressible as differential equations of finite order and degree, with rational coefficients. The most natural ways of well-ordering these are such that those of low order and degree, and involving no numerical constants other than small integers and fractions with small numerators and denominators, come earliest in the sequence. Accordingly, the practice of adopting the simplest law that fits the available observations appears to be closely related to the possibility of a satisfactory theory of inference."]

PROCEEDINGS OF THE LONDON MATHEMATICAL SOCIETY, series 2, volume 20, part 3, August, 1921: "The classification of rational approximations" by P. J. Heawood, 233–240 [The construction of irrational numbers θ for which there are at most only a finite number of approximations x/y such that $|x/y - \theta| < 1/ky^2$ for a given value of k, x/y being a fraction in its lowest terms].

REVISTA DE MATEMATICAS Y FISICAS ELEMENTALES (See *1920*, 475; Spanish), volume 3, August, 1921: "Notes on analytical geometry" by E. Rebuelto, 73–78; "On projective coördinates" (conclusion) by F. D. Jaime, 78–84; "Note: On the sums of certain series" by J. S. Corti, 84–85—September: "The vectorial product" by T. Lalescu, 97–99; "Construction of conics" by J. S. Cortie, 99–101; "Notes: Rapid elimination of x from two equations of the third degree" by B. I. Baidaff, 106; "A relation of the theory of numbers" by T. I. G. Lintes, 106–107; Problems solved, Exercises, Problems proposed, 112–120.

REVUE GÉNÉRALE DES SCIENCES, volume 32, August, 1921: "Développement mathématique élémentaire de la relativité restreinte" by M. Sauger, 453–459 [A very simple derivation of the Lorentz equations and some mechanical and physical consequences]; Bibliographie: H. Broggi, *Análisis matemático*, 480 ["L'apparition de ce volume est un nouvel indice du mouvement qui tend à substituer, dans l'Amérique latine, aux ouvrages didactiques en langues étrangères ou aux traductions d'ouvrages étrangers, des œuvres dues aux professeurs et savants locaux."]—September: Bibliographie, 515, "Du Pasquier—le développement de la notion du nombre" [review] by Dr. Sorel.

REVUE SCIENTIFIQUE, volume 59, August 27, 1921: "La description géométrique des Alpes françaises" by L. R., 465 [Comments on the geodesic work of M. Helbronner as described in *La Montagne*, January, 1921]—September 10: "Notes et actualites: La Société des Amis des Sciences," 505–507 [Address of its President, M. Emile Picard. Quotation: "Mesdames, Messieurs, nous nous efforçons d'employer le mieux possible notre petite fortune, en suivant les intentions des fondateurs de la Société. Vous savez qu'ils s'étaient proposé de mettre à l'abri du besoin les savants et inventeurs peu fortunés, ainsi que leur famille après leur mort. Il nous était déjà impossible de remplir ce programme à la lettre avant la guerre, dans ces temps à la fois si proches et si lointains, où nous n'appréciions pas suffisamment, semble-t-il, la douceur de vivre à bon marché. . . . Quand ces temps heureux seront revenus, notre Société, recevant de toutes parts des dons généreux, deviendra une sorte de Ministère de la reconnaissance publique envers les savants et inventeurs malheureux. Je veux croire que ce n'est pas là un rêve; en attendant sa réalisation, continuons, mes chers collègues, notre propagande en faveur de l'œuvre qui nous est chère, et cherchons à lui amener de nouvelles recrues pour son action bienfaisante."]

SCHOOL SCIENCE AND MATHEMATICS, volume 21, October, 1921: "A dream come true" [an account of an experiment in teaching geometry inductively] by W. A. Austin, 621–627; "An extension of a process in factorization" by S. M. Karmalkar, 628–630; "Falling bodies in ancient and modern times" by F. Cajori, 639–648 [discussion of the question whether the story of Galileo's experiments at the tower of Pisa is mythical. See *Science*, n.s., volume 51, pp. 615–616, June 18, 1920; volume 52, pp. 272–273, September 17, 1920, and p. 409, October 29, 1920. "Recent criticism endeavors to sift the truth from a conglomerate mass of facts and fiction in the history of science. The movement is to be welcomed, whenever the work is carefully done. But an iconoclast may brush aside both facts and fiction, and leave unto the reader of science only a barren waste. The rebuilder of the historic structure may be an untrained architect with no sense of proportion or comprehension of the values of historic materials. The subject of falling bodies has had its trained historians and its amateurish historians. Comparatively simple questions have received different answers. Has Aristotle been misrepresented by Galileo to modern writers? Did Aristotle actually claim that a heavier body falls faster in proportion to its weight? Some years ago an English writer, J. H. Hardcastle, denied this. Quoting a brief passage from Aristotle he argued that historians had grievously erred, that the great Peripatetic had been stupidly misunderstood. . . . Other of England's noted scientists made brief comments, basing their arguments on the one passage taken from Aristotle. Thus G. Greenhill, William Ramsay, and Oliver Lodge arrive at the conclusion that Aristotle has been misinterpreted, that he did not mean a body ten times heavier would fall from rest ten times faster, that he was thinking of a body moving through a resisting medium, like the air, which greatly modifies the motion, and was considering, not its initial, but its terminal velocity." They "did not themselves go back to search in Aristotle's writings; their deductions were based on the one quotation which had been brought to their attention. As a matter of fact, that one quotation gave only a partial exposition of Aristotle's theory."]; "Gerbert's letter to Adelbold" by G. A. Miller, 649–653; "The mathematics needed in freshman chemistry" by L. W. Williams, 654–665 [A classified list of over three hundred "mathematical" terms is given. The list includes such terms as "subdivisions," "double," "year," "1/3."]; "Do high school pupils dislike mathematics" by W. E. Gingery, 674–675; Problems and Solutions, 676–679; "Reception to the members of the National Committee of Mathematics Requirements for Secondary Schools" by W. J. Ryan, 696, 698—November: "An analysis of an experiment in teaching first year mathematics" by Ina E. Holroyd, 757–764; "Some plane geometry problems" by Lida C. Martin, 765–769; Problems and Solutions, 787–790; "The National Committee on Mathematical Requirements," 798, 800.

TÔHOKU MATHEMATICAL JOURNAL, volume 19, nos. 3–4, July, 1921: "The late Prof. Dr. Tetsugo Kojima" (Japanese), insert; "Sur les surfaces sphériformes" by G. Tiercy, 149–163; "Über Maxima und Minima von quadratischen Formen mit unendlichvielen Variabeln" by T. Kubota, 164–168; "Sur les équations différentielles homogènes" by F. Sibirani, 169–172; "On the roots of an algebraic equation" by M. Tajima, 173–174; "On the solutions of Mathieu's equations of the second kind" by S. C. Dhar, 175–182; "Cyclotomic sexe-section" by P. O. Upadhyaya, 183–186; "On the twisted cubic of constant curvature" by S. Narumi, 187–195; "On the characteristic property of the conic section" by S. Narumi, 196–204; "On the osculating conics of a plane curve" by T. Hayashi, 205–209; "Ueber gewisse Infinitesimal-Operationen der höheren Operationsstufen" by R. E. Moritz, 210–237; "Bemerkungen zu der Arbeit von Herrn Ogura: 'On the theory of the tides'" by O. Perron, 238–240; "Bemerkung über die Mittag-Lefflerschen Funktionen $E_a(z)$" by G. Pólya, 241–248; "Pentaspherical geometries in noneuclidean space, I" by T. Ota, 249–270; Shorter notices and reviews, 271–275; Miscellaneous notes, 276–279.

ZEITSCHRIFT FÜR ANGEWANDTE MATHEMATIK UND MECHANIK, volume 1, August, 1921: "Über algebraische Gleichungen, die nur Wurzeln mit negativen Realteilen besitzen" by J. Schur, 307–311.

UNDERGRADUATE. MATHEMATICS CLUBS.

All reports of club activities should be sent to E. L. DODD, 3012 West Ave., Austin, Texas.

CLUB ACTIVITIES.

THE MATHEMATICAL CLUB OF ADELPHI COLLEGE, Brooklyn, N. Y.

The Mathematical Club of Adelphi College was founded in the fall of 1898; and is apparently one of the oldest mathematical clubs in the country. Membership is open not only to students but to their friends. Meetings are held the second Wednesday of each month, and are well attended. The club has also a social meeting once a year.

During the year 1920–21 talks have been given upon the topics: "Lewis Carroll as a mathematician;" "Women as mathematicians;" "The trisection of an angle;" and certain topics suggested in THE AMERICAN MATHEMATICAL MONTHLY.

(Report by Evelyn Brisbane, secretary.)

THE MATHEMATICS CLUB OF COOPER UNION, New York City.

The Mathematics Club of Cooper Union was organized October 11, 1920. At this meeting it was decided to limit active membership for the current year to first-year and second-year